



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005VI53B

Title: Assessing the Sediment Retention Function of Salt Ponds on the US Virgin Islands – Implications for Management

Project Type: Research

Focus Categories: Wetlands, Water Quality, Methods

Keywords: salt ponds, wetlands, function, natural resources, turbidity, remote sensing, GIS, land use, management

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Principal Investigators:

Denise Rennis

Barry Devine

Colin Finney

Abstract

Salt ponds perform a variety of biological, hydrologic and water quality functions with benefits to both wildlife and humans. Sediment retention is one of these, and salt ponds are known to act as retention basins and facilitate deposition of particles within the pond. This in turn helps to protect sensitive coastal resources, such as coral reefs and seagrasses, that can be adversely impacted from siltation. The features of salt ponds are subject to seasonal variations that result in potentially significant temporal changes to the functions that the ponds provide. No detailed examination has been given to the sediment retention function of salt ponds on the US Virgin Islands (USVI).

Because of their position along the coast, all the salt ponds on the USVI are threatened by intense development pressure. The full impact to salt ponds of this development is unknown, however sedimentation that is in excess of what can be naturally assimilated,

must lead to physical changes within the pond and/or its connection to the sea. This, in turn, leads to impairment of its functional ability to limit the transfer of suspended particles to the nearshore coastal zone. Understanding how development and disturbance has affected the wetland system over time and the trends that have occurred is important in understanding this function and its limitations.

Ultimately being able to apply this information to management decisions will lead to sustainable land-use and management practices based on sound science. Using remote sensing imagery to aid in the understanding of the consequences and trends of management decisions on this function and linking this to a centralized geographical information system (GIS) could provide an effective management tool for regulatory, land management and conservation organizations.

The objectives of the study are:

1. Identify the features of salt ponds on small tropical volcanic islands that are important in carrying out the wetland function of sediment retention;
2. Document historical changes to the functional capacity of USVI salt ponds and their watershed to retain sediments through examination of available data, historical rainfall levels, coastal zone permits and remote sensing information;
3. Identify correlations between salt pond features, rainfall and nearshore coastal turbidity;
4. Identify trends to enable sound regulatory and land-use management decisions that will help to ensure a high functional ability of salt ponds to retain sediments;
5. Provide students with an opportunity to apply and analyze new and traditional scientific methods for monitoring environmental change;
6. Evaluate a remote sensing methodology as a management tool to predict and monitor the performance of sediment retention in salt ponds.

To accomplish these objectives, the study will consist of seven tasks: 1) Collaboration and selection of key characteristics; 2) Data review; 3) On-site assessments and data verification; 4) Data gap identification and analysis; 5) Data collection; 6) Geographical Information System (GIS) mapping and 7) Data analysis, reporting and information dissemination.